

4/8/15

Progress Report for “Developing a Proactive Framework for Adaptive Management of Chronic Wasting Disease on the National Elk Refuge”

The modeling project had an original deadline of November 2015. This deadline was extended to April 30, 2016 via mutual agreement between the principle investigators and the National Elk Refuge. The primary reason for the extension was that one of the principal investigators, Ryan Monello, took another position that will limit his ability to work on the project.

Justification for the Bayesian Modeling Approach from Project Proposal:

Past modeling attempts make long-term projections of the arrival and subsequent transmission of CWD in the Jackson Hole area highly uncertain, predicting an enormous range of outcomes (e.g., Osnas 2011), which limits their value for guiding management and policy. However, extensive demographic data are available for elk in this region and can be combined with data from studies of CWD in elk elsewhere in the Rocky Mountains to reduce uncertainty about how CWD may shape the dynamics of the Jackson Hole elk population. This approach is enabled by the advent of new Bayesian state-space models and CWD studies on free-ranging elk (LaDeau et al. 2011, Monello et al. 2013, 2014, and unpublished/ongoing project data). Ultimately, developing this approach will allow managers to respond to the emergence of CWD in an informed way. Managers will be able to forecast how differing levels of CWD will interact with elk recruitment, survival, and migration to determine the population's trajectory in Jackson Hole. These forecasts will be properly tempered by rigorous estimates of uncertainty.

Project Objectives:

1 – Develop a Bayesian state-space model to support adaptive management of CWD in the Jackson Hole elk population. The model will provide a framework for using multiple sources of data to make reliable forecasts tempered by rigorous estimates of uncertainty.

2 – Use the model and existing empirical data (e.g., population surveys and classifications) to determine the potential impact of CWD on the National Elk Refuge/Jackson Hole elk herd. We will estimate the relationship between prevalence of CWD (proportion of elk infected) and the rate of population growth (λ) of the Jackson Hole elk population using at least two sources of data: herd-specific recruitment and population data for elk that winter in Jackson Hole and summer in a wide variety of different locations; and survival data from free-ranging elk naturally infected with CWD in Rocky Mountain National Park, Colorado (the only current source for such data).

To facilitate project work Refuge manager Steve Kallin and Refuge biologist Eric Cole met with Tom Hobbs on March 18, 2015. At that meeting we discussed the Bayesian modelling approach, the segments of the Jackson Elk Herd population that will be modeled, and data needs to support the modeling effort. Given interchange among elk that winter on the National Elk Refuge and elk that utilize State operated feedgrounds in the Gros Ventre drainage, we determined that the population of interest will be all feedground elk in the Jackson Elk Herd. The feedground segment represents 80-90% of the

Jackson Elk Herd, has the highest quality demographic data, and is the segment of the population most susceptible to the density dependent effects of CWD. We made arrangements to transfer relevant demographic and other data from the National Elk Refuge and Wyoming Game and Fish Department.